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FINAL PERFORMANCE REPORT

Period of Performance: 1 September 2009 – 31 August 2010

GRANT N00173-09-1-G036

ARL Support of NRL Rocket Experiments to Investigate Ionospheric Phenomena

BY

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OBJECTIVE

Applied Research Laboratories, The University of Texas at Austin (ARL:UT), proposed to operate the Coherent Ionospheric Doppler Receivers (CIDRs) in the NorthEast CIDR Array (NECA) in support of two Naval Research Laboratory (NRL) rocket experiments to launched from the Wallops Island Test Facility. NECA is a network on CIDRs that includes a receiver at Wallops Island, Virginia and Millstone Hill, Massachusetts. Each rocket carried a dual-frequency VHF/UHF radio beacon onboard the rocket. ARL:UT was to provide equipment trouble-shooting and data processing for these experiments.

WORK PREFORMED

Of the two NRL rocket experiments, the first was launched on 17 September 2009. ARL:UT traveled to Wallops Island for this test. There the ARL:UT PI (Dr. Trevor Garner) participated in all of the preflight drills, launch simulations, and test runs. Additionally, Dr. Garner tested the Wallops CIDR and updated some of the CIDR software. When the rocket was launched on 17 September, Dr. Garner initialed the rocket tracking code, and the CIDR initially locked onto the rocket's beacon. Unfortunately, the CIDR software was not prepared to operate on the flight telemetry data provided by the WITF, and the CIDR failed to track one minute after launch. Thus, the CIDRs did not provide any useful data for the CARE rocket mission. The CIDR software was modified to prevent this problem form happening in the future. In addition, Dr. Garner participated in two after-action CARE reports. One immediately after the rocket experiment and a second held at Millstone Hill roughly a month afterwards.

Dr. Garner was informed by Dr. Paul Bernhardt in January 2010 that the second rocket experiment was canceled. Upon seeking direction for the reallocation of the funds under this project, Drs. Bernhardt and Garner agreed to reallocate the funds to support NRL's ongoing efforts to develop an ionospheric tomography network in South America to support the C/NOFS satellite mission. Under this work, Dr. Garner provided CIDR-C/NOFS observations of the ionosphere with the CIDR located in Ancon, Peru to Dr. Matt Hei of NRL, discussed the future designs of the South American tomography receiver chain with Dr. Hei, and developed an automated data delivery script for the Ancon station to have the data delivered directly to the LISN data server. This funding also partially supported Dr. Garner's participation at the International Beacon Symposium and the Coupling, Energetic and Dynamics of Atmospheric Regions (CEDAR) meetings.

NEW FINDINGS

None

PERSONNEL SUPPORTED: Research Associate and Research Technician

PUBLICATIONS: None

INTERACTIONS: Dr. Garner participated in the CARE experiment as a part of the NRL team and interacted with several of other scientists and team members. He also discussed CIDR operations and data flow with members of the LISN network and NRL CERTO beacon team.

NEW DISCOVERIES: None

HONORS/AWARDS: None

Trevor W. Garner

Dr. Trevor W. Garner
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